

MESTA 160-INCH PLATE MILL  
Homestead  
Allegheny County  
Pennsylvania

HAER No. PA-301

HAER  
PA  
2-HOME,  
1-

WRITTEN HISTORICAL AND DESCRIPTIVE DATA  
REDUCED COPIES OF MEASURED DRAWINGS

Historic American Engineering Record  
National Park Service  
U.S. Department of the Interior  
1849 C St., NW Room NC300  
Washington, DC 20240

HISTORIC AMERICAN ENGINEERING RECORD

MESTA 160" PLATE MILL

HAER No. PA-301

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PA  
2-HOME  
1-

**Location:** Homestead Works, Homestead, Allegheny County, Pennsylvania

**Date of Construction:** 1941

**Builder:** Defense Plant Corporation  
Mesta Machine Company

**Significance:** Rated with an annual capacity of six hundred thousand tons, the 160" mill could produce plates of many types and sizes. Not limited to light-gauge carbon steel, the mill also produced alloy steels and heavy-gauge steel that required flame-cutting. Standard plate sizes ranged up to 720" in length, between 38 and 144 inches in width, and were typically between 3/16 and 1 1/2" in thickness. Although the 160" plate mill at Homestead contributed to the shipbuilding effort during World War II, its greater utility came during peacetime as a substantial addition to the industrial stock of the Pittsburgh region.

**Project Information:** The Monongahela Valley Recording Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. A division of the National Park Service, U.S. Department of the Interior, the HAER program is administered by the Historic American Buildings Survey/Historic American Engineering Record. Documentation of Mesta 160" Plate Mill in the summer of 1994 was sponsored by the U.S. Department of Defense Legacy Resource Management Program.

The field work, drawings, historical reports and photographs were prepared under the direction of Eric N. DeLony, Chief of HAER, and Dr. Dean Herrin, Project Leader. The recording team consisted of Joel Sabadasz, HAER Historian and Project Supervisor, Christopher H. Marston,

Architectural Supervisor, Sandra Price (Arizona State University), Thomas Ingram (University of Virginia), Sean T. Blaire (Cal Poly-San Luis Obispo), and Sean Ray-Fraser (ICOMOS/Canada), Architectural Technicians. Jennifer Bannister (Carnegie Mellon University) served as a project historian.

Photographs of the Mesta 160" Plate Mill taken by Martin Stupich in 1989 can be found under HAER No. PA-200-F. An overview history and inventory of the individual structures on the Homestead site can be found under HAER No. PA-200.

World War II Production in Allegheny County;  
Mesta Machine Company

This project focuses on the World War II production activity of the Mesta Machine Company. Located six miles east of downtown Pittsburgh in West Homestead, Pennsylvania, Mesta Machine contributed significantly to the massive defense and war production effort that characterized the Pittsburgh industrial region during World War II. A maker of steel mill equipment for customers located throughout the world since 1898, Mesta continued these specialized operations during the World War II, designing and building machinery for such projects as the plate mills for the neighboring Homestead Works of the Carnegie-Illinois Steel Corporation (a subsidiary of the United States Steel Corporation) and the federally-owned Geneva Plant in Utah, as well as blooming, structural, and merchant mills for the Kaiser Company in Fontana, California.

Mesta's war production capacities were not limited to rolling mill equipment, however. Even before the United States entered the war, Mesta Machine added forging and casting capacity to increase ordnance production at the facility. Guns, gun tubing, and gun carriages of various types and sizes were manufactured at the West Homestead plant. Additionally, the Navy Department funded the construction of a factory adjacent to Mesta Machine in which the company made naval armaments and shipbuilding equipment.

A study of the Mesta Machine Company offers an excellent opportunity to analyze the relationships between government and industry during a period of national emergency and through the process of peacetime renegotiation and reconversion. Mesta Machine contributed both directly and indirectly to the war effort through its ordnance production and rolling equipment production, and this paper will explore not only Mesta's contribution in these arenas, but also the effects of wartime activity on the production flows, labor relations, and financial prosperity of this multi-faceted company.

*Shaping Steel - a brief overview*

The shaping of steel is a complex process, and a brief review of this stage of production will be helpful in assessing Mesta Machine's role in the steel community. Mesta concentrated its engineering skill and productive capacity on the shaping and finishing end of steel production. While this section will discuss only flat-rolled products, specifically plate steel, it is important to note that Mesta built equipment for many types of rolling mills including sheet and strip mills, blooming mills, slabbing mills, rail mills, structural mills, bar mills, wire

mills, and tube mills.

The production of steel plate consists of five basic steps. First, a 15-inch steel slab was reheated to a malleable temperature, about 1500 degrees, in a reheating furnace. Second, the red-hot slab was passed to a scale-breaker, where the hard iron-oxide covering ("scale") that had formed on the surface of the reheated steel was broken up and removed by fluted rolls and high pressure water sprays.<sup>1</sup> Third, the de-scaled slab passed to the rolling mill, where it was rolled down to the desired gauge either in a single reversing-mill stand or in a series of mill stands. In the fourth step, the steel passed through a leveler, where it was flattened and straightened. Finally, the plate moved to the shearing department, where the sides, back, and front were cut to the desired dimensions.<sup>2</sup> For a schematic diagram of the flow of materials through a typical plate mill, see Sheet 4 of the architectural report accompanying this paper.<sup>3</sup>

#### *Mesta Machine Company, 1898-1939*

The Mesta Machine Company was founded in 1898 as a consolidation of the Robinson-Rea Manufacturing Company and the Leechburg Foundry and Machine Company. George Mesta, the founder of the Mesta Machine Company and its president until his death in 1925, was trained as an engineer at the Western University of Pennsylvania (now the University of Pittsburgh) and patented a pickling machine for removing scale from steel in 1892 while working for the Leechburg Foundry and Machine Company.<sup>4</sup> Under George Mesta's leadership, the Mesta Machine Company quickly became a locus of technological and engineering innovation in the steel industry.

The original plant of the Mesta Machine Company stood on ten acres of land abutting Carnegie Steel Corporation's Homestead Steel Works. Straddled by the Pennsylvania Railroad and the

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<sup>1</sup>Scale can cause blistering and pitting on the surface of the steel, leading to imperfections in the finished product.

<sup>2</sup>For an in depth treatment of all stages of steel production, see US Steel Corporation's *Making, Shaping, and Treating of Steel* (various editions).

<sup>3</sup>Historic American Engineering Record, National Park Service, Sean Ray-Fraser, 1994.

<sup>4</sup>Hi Howard, "Mesta Co. Marks 50 Years of Making Machinery," *Pittsburgh Sunday-Sun-Telegraph*, November 21, 1948 (Carnegie Public Library, Pennsylvania Department, clippings file); "Mesta Machine Co. Has 50th Anniversary," *Blast Furnace and Steel Plant* 36:12 (December 1948), 1470.

Pittsburgh, McKeesport and Youghiogheny Railroad, and with direct access to the Baltimore and Ohio Railroad and the Monongahela River, the site was ideal for the easy shipment of goods to and from the facility. One of Mesta's primary advantages lay in its close proximity to the numerous steel works in the Pittsburgh region that were scattered along the Allegheny, Monongahela, and Ohio rivers. By 1901, Mesta Machine had become the largest individual works in the United States making rolls and rolling mill equipment; it was also the only manufacturer of chilled, sand, and steel rolls with its own steel plant. The metal yard, the foundry buildings, the chipping and cleaning buildings, and the machine shops were arranged to ensure high efficiency and quality in throughput. The trade journal *Iron Age* touted the Mesta Machine plant's arrangement as unique in the machinery industry.<sup>5</sup>

Mesta Machine grew quickly in the decades before World War II spurred extensive expansion at the West Homestead plant. By 1909, acreage had doubled to twenty acres, and facilities for the machining and erecting departments had been expanded from 69,700 square feet to 210,000 square feet, a 200 percent increase. The pattern department, where patterns for foundry department molds and castings were made, had also been significantly expanded by 1909.<sup>6</sup>

Lorenz Iversen, a Danish engineer who started with the company in 1901 as a drafter, headed the company from 1930 to 1963 and maintained George Mesta's tradition of growth and innovation for the company. During the Depression of the 1930's, the Mesta Machine Company expanded its production facilities, simultaneously encouraging its customers to do the same. By 1932, the Mesta plant extended for more than a mile along the Monongahela, with the forge shop and the machining and erecting departments the primary sites of growth and investment during the first two years of the Depression.<sup>7</sup> In 1937, with net earnings at an all-time high of over \$4.5 million, the company invested over \$1 million in machine tools, several new annealing furnaces, and a new department for producing hardened and ground forged-

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<sup>5</sup>"The Mesta Machine Company," *Iron Age* 68 (November 14, 1901), 9.

<sup>6</sup>"Improvements in the Plant of the Mesta Machine Co.," *Iron Trade Review* 45:7 (August 12, 1909), 294-295.

<sup>7</sup>"Modernization Program Carried Out During the Depression," *Iron Age* 130 (September 1, 1932), 326-327.

steel cold mill rolls.<sup>8</sup>

Although subject to fluctuations, throughout the 1930's Mesta Machine consistently managed to turn a profit. Between 1930 and 1931, profits fell from just over \$2 million to less than \$350,000, the most drastic drop in the company's history. Mesta Machine subsequently ceased investment in new buildings and machinery during 1932 and 1933. Orders carried over into the new fiscal year also declined markedly in the early 1930's.<sup>9</sup> After 1935, however, profits rose in response to the expansion initiatives in the steel industry, and Mesta won a large order from Carnegie-Illinois for a continuous hot strip mill at the company's Irvin Works in Dravosburg, PA. In 1936 and 1937, Mesta achieved its highest annual earnings in its history, profits that were not matched again until 1948.<sup>10</sup> In 1938 and 1939, with the steel industry's expansion program waning and both orders and prices falling, Mesta Machine's board of directors worried about how the company could comply with requests for cooperation from the federal government to help alleviate the employment crisis.<sup>11</sup> The outbreak of war in Europe solved that quandary.

Mesta Machine produced a broad range of equipment for the steel industry in the years before the World War II; Iversen boasted that the size of Mesta's products was limited only by the carrying capacity of railroad cars.<sup>12</sup> From its early years of production, Mesta made the heavy-duty engines for rolling mills and power plants, rolls and rolling equipment for all types of steel mills, blowing engines for furnaces, machine molded and cut gears of massive and precise dimensions, huge castings weighing up to 350,000 pounds, as well as a variety of smaller machined parts. All of these items could be custom-designed and installed by the company. To create such diverse and often unique items,

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<sup>8</sup>Ben C. Brosheer, "Precision Mills for Modern Steels," *American Machinist* 82:17 (August 24, 1938), 755.

<sup>9</sup>*Annual Report of the Mesta Machine Company for the Fiscal Year Ended December 31, 1930, 1931, 1932.* (uncatalogued material, Historical Society of Western Pennsylvania) Hereafter, *Annual Report*.

<sup>10</sup>*The Bulletin Index*, Pittsburgh, March 5, 1936; "Mesta's Earnings Highest in History," *Pittsburgh Press*, February 28, 1936 (clippings file, Pennsylvania Department, Carnegie Public Library); *Annual Report*, 1936-1948.

<sup>11</sup>*Annual Report*, 1939.

<sup>12</sup>*The Bulletin Index*, Pittsburgh, March 5, 1936; "Mesta's Earnings Highest in History," (clippings file, Pennsylvania Department, Carnegie Public Library).

Mesta designed most of its own equipment, ensuring the precision, simplicity, and versatility of each piece of machinery.<sup>13</sup>

Because of the wide variety of products made by the Mesta Machine Company, it is difficult to identify a single, standardized "flow of materials" through the plant. The company's several thousand workers operated nine primary departments at the West Homestead plant, apart from the laboratories. The foundry and the pattern shop were located at one end of the plant. In these departments, the patterns for all Mesta castings were built. The foundry department had three sections for the three primary types of castings made at Mesta Machine: iron foundry, the roll foundry, and the steel foundry, which was supplied by four-gas-fired open hearth furnaces. Castings passed from the foundry to the heat-treating department, where the pieces were heated slowly to refine the grain and relieve the stresses in the metal.<sup>14</sup> The forging department made very specific products that could not be achieved through either rolling or extrusion, a shaping technique in which metal is forced through a die.<sup>15</sup> While all heavy forging was performed by steam or hydraulic presses, Mesta also had a hand-forging section equipped with drop-hammers for manipulating smaller pieces.<sup>16</sup> Finishing occurred in the machine shop, which was equipped with planers for smoothing surfaces, lathes for general metal cutting, boring mills for vertical cutting, and gear cutters for machining the huge gears that Mesta manufactured.<sup>17</sup> Next to the machine shop, workers assembled equipment in the erecting department. Adjacent to the erecting department, the different types of rolls that Mesta manufactured for rolling mills were roughed and finished in the roll turning department. Additional departments at the West Homestead plant included the gear molding and gear

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<sup>13</sup>"Modernization Program Carried Out During the Depression," *Iron Age* 130 (September 1, 1932), 327; Philip Scranton, "Diversity in Diversity: Flexible Production and American Industrialization, 1880-1930" *Business History Review* 65:1 (Spring 1991), 27-90.

<sup>14</sup>J.M. Camp and C.B. Francis, *The Making, Shaping, and Treating of Steel* (Pittsburgh: United States Steel Corporation), 547-548; A.B. Everest, "Heat Treatment in the Foundry," in E.D. Howard, *Modern Foundry Practice*, (London: Odhams Press, Ltd., c1943), 61.

<sup>15</sup>Camp and Francis, 590-591.

<sup>16</sup>Brosheer, 755.

<sup>17</sup>Mesta Machine Company, *Plant and Product of the Mesta Machine Company* (Pittsburgh, 1919), 28; Fred Colvin, *The Machinist Dictionary* (New York: Simons-Boardman Publishing Company, 1956).



cutting departments.<sup>18</sup>

The Mesta Machine Company had a symbiotic relationship with the steel industry, particularly Pittsburgh steel. As a supplier of machinery, the company marketed not only equipment, but also the design and engineering skills that created the machinery. As an auxiliary industry, Mesta and other machinery-builders were dependent on growth and expansion in the steel industry for continuing profits. Although Pittsburgh was not the sole steel-producing region in the United States, it was traditionally the largest. Mesta had customers through the United States and around the world, but the geographical proximity of Pittsburgh's many steel mills made it a primary market for Mesta-built machinery. The development of the Pittsburgh steel industry offered an opportunity for steel companies and auxiliary industries to group together and minimize transportation costs, spread risks among multiple trading partners, as well as pool information and capital sources.<sup>19</sup>

#### *Steel in Pittsburgh*

Pittsburgh was the foremost producer of steel throughout the early years of the twentieth century. Much of the productive capacity in the Pittsburgh region was devoted to heavy gauge steel, however. During the 1920's, with the increasing demand for lighter gauge sheet and strip steel spurred by the automobile and appliance industries, the strength of the Pittsburgh steel industry waned in comparison with the Great Lakes area steel producers. The growth of Pittsburgh steel was also seriously impaired during these decades by the loss of favorable transportation-rates that had once favored Pittsburgh over all other regions. Between 1904 and 1934, Pittsburgh's share of steel production fell from 40 percent to 25 percent.<sup>20</sup>

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<sup>18</sup>Mesta Machine Company, *Plant and Product of the Mesta Machine Company*, 20, 36.

<sup>19</sup>Michael Storper and Richard Walker, *The Capitalist Imperative* (New York: Basil Blackwell, Inc., 1989), 226, 138. Storper and Walker theorize four stages of geographical industrialization: localization, in which economic specialties develop within regions, but with no even distribution; clustering, in which activities related to the dominant industry move to the area; dispersal, in which production shifts away from the traditional center toward the periphery; and shifting centers, in which new or modified industries shift the center entirely away from its traditional core.

<sup>20</sup>Kenneth Warren, *The American Steel Industry, 1850-1970: A Geographical Interpretation* (Pittsburgh: University of Pittsburgh Press, 1973) 195-213, 225; United States Department of Labor, Bureau of Labor Statistics, *Impact of the War on the Pittsburgh, Pennsylvania Area* (January, 1943), 9.

During the Depression, heavy steel, a durable good, fared much worse than sheet and strip steel, which were buoyed by a sustained market for electrical appliances and tin cans. Virtually all mills constructed during the 1930's were sheet or strip mills.<sup>21</sup> To take advantage of this burgeoning market, U.S. Steel and the Jones and Laughlin Steel Corporation both constructed light gauge steel mills in the Pittsburgh region in the 1930's.

World War II pulled the Pittsburgh steel industry out of this slump with the increased demand for heavy plate steel for ships and tanks. The Pittsburgh region became a crucial site of war production in many industries, and additional capacity was financed both by individual companies and the federal government. The Mesta Machine Company played a dual role in the build-up of the nation's war-making capacity: first, by equipping steel companies with added productive capacity for war, and second, by producing ordnance for direct war use.

The federal government assumed an active role in increasing the output of essential industries through a variety of institutional channels. World War I had left many businesses with bitter memories of canceled contracts and over-expansion, and the federal government recognized that private industries would not independently finance construction of armament facilities.<sup>22</sup> Much of the expansion in industries not producing ordnance materials was funded by the Defense Plant Corporation (DPC), a subsidiary organization of the Reconstruction Finance Commission. The War Department and the armed forces often used the DPC as an alternate lending agency for the construction of plants that could be converted to postwar civilian use.<sup>23</sup> The DPC was particularly active in the steel industry, which, as a "mature" industry was fearful of expansion because of excess capacity during the Depression.<sup>24</sup> One DPC project in the

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<sup>21</sup>William T. Hogan, *Economic History of the Iron and Steel Industry in the United States*, vol. 3 (Lexington, Massachusetts: DC. Heath and Company, 1971), 1119-1120.

<sup>22</sup>White, 3. For more on the War Industries Board of World War I, see Robert D. Cuff, *The War Industries Board: Business-Government Relations during World War I* (Baltimore: Johns Hopkins University Press, 1973). For contract cancellations in particular, see: 241-264.

<sup>23</sup>Gerald T. White, *Billions for Defense: Government Financing by the Defense Plant Corporation during World War II* (University, Alabama: University of Alabama Press, 1980), 57.

<sup>24</sup>Warren, 240; White, 107.

Pittsburgh region was the 160-inch plate mill at the Carnegie-Illinois' Homestead Works, for which Mesta designed and erected a large portion of the machinery. Mesta did not receive DPC funding for its own expansion; the company, the War Department, and the Navy Department all financed portions of the additional capacity at the West Homestead facility.

The DPC had two types of lease agreements, one of which was virtually identical to the type of agreement between the Mesta Machine Company and the War and Navy Departments. This type of contract established that the government own facilities or equipment and lease them to a contractor, usually for the nominal fee of one dollar per year. This arrangement suited manufacturers supplying materials directly to the federal government, as with the Mesta Machine Company and its ordnance production projects. The second type of lease set up by the DPC was for companies not dealing directly with the federal government but supplying materials for other companies involved in defense production. Rental fees paid by the company to the DPC for these facilities were based on the volume of company sales from the facility.<sup>25</sup> The federal government invested approximately \$7.5 billion in wartime industrial projects; 32 percent of this was invested by the DPC.

#### *War Production at the Mesta Machine Company, 1939-1945*

As war began in Europe, thus signaling an increased demand for the heavy equipment that Mesta had built its reputation on, the company initiated its expansion program. The Board of Directors, led by Lorenz Iversen, set aside \$1 million for the expansion of forging facilities at the plant, including the installation of a 6000-ton forging press, several heat treating furnaces, and additional finishing facilities. Underway by early 1940, the new forging plant began full operation before the end of the 1940 fiscal year.<sup>26</sup> Also in 1940, the Board of Directors appropriated \$1.5 million to fund a variety of projects, including the purchase of six acres of land adjoining the east end of the plant, relocation of pre-existing railroad tracks, and construction of three new buildings with a total area of 126,000 square feet. Two of these buildings were to house Mesta-owned finishing equipment, and the third would contain government-owned

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<sup>25</sup>White, 30; War Department Contract, # W-ORD-486, October 1940 (Prothonotary Office, Pittsburgh, PA).

<sup>26</sup>"Mesta Expansion Will cost \$1,000,000, Iversen Announces," *Iron Age* 145 (March 7, 1940), 129; *Annual Report*, 1940.

equipment for finishing large field-guns.<sup>27</sup>

The government-owned equipment in the new building was part of a 1940 contract between the Mesta Machine Company and the federal government. The largest contract ever won by Mesta Machine, it was also the largest ordnance contract awarded in Pittsburgh in 1940 and arranged for 355 155-millimeter guns to be produced at the Mesta plant by June 30, 1942. The first deliveries were expected by May of 1941. Mesta owned the buildings and the land, while the federal government leased the equipment to the company for the nominal fee of one dollar per year.<sup>28</sup> Much of the machinery was built by Mesta and sold at cost to the federal government, but eight lathes dating from World War I were taken from storage at the Watervliet Arsenal in New York State and refurbished at Mesta for the 155-millimeter gun plant.<sup>29</sup>

This contractual agreement proved significant not only for its contributions to the war effort, but because it also tested the legal precedent for taxation of federally-owned industrial property. On January 1, 1942, an Allegheny County property tax assessor estimated the value of the machinery and machine tools in the new ordnance department at Mesta Machine to be \$618,000. Tax on this amount, \$5,137, was added to the total tax due to the county from the company.<sup>30</sup> This provoked an immediate outcry from the Mesta Machine Company and the federal government because federally-owned property was not generally subject to local taxation. The equipment in question at Mesta Machine was all owned by the federal government, although some had been built by the company and all was installed in buildings owned by the company at its West Homestead plant. The county Board of Assessment argued that the equipment was part of the real property of the Mesta Machine Company, added to the profits

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<sup>27</sup> *Annual Report*, 1941.

<sup>28</sup> "General Inspection by F.F. Johnson," March 20, 1941, RG 179, entry 345.21042c, box 1193. Lt. Colonel L.H. Campbell (Assistant Secretary of Industrial Service, Facilities, Ordnance Department) to Colonel H.E. Rutherford (Chairman, Site Board, Office of Assistant Secretary of War, September 20, 1940, RG 107.

<sup>29</sup> "Mesta Machine Company," *Men and Women of Wartime Pittsburgh and Environs* (Pittsburgh: Frank C. Harper, 1945), 256; Prothonotary records, Pittsburgh, PA.

<sup>30</sup> *Mesta Machine Company v. County of Allegheny*, Court of Common Pleas of Allegheny County, Case 1560, July 1942. (Prothonotary Records, Pittsburgh, PA).

garnered by the company, and therefore should be taxed.<sup>31</sup>

All parties recognized the Mesta case as an important test case for federally-owned war production plants in the United States.<sup>32</sup> If government-owned equipment were subject to local taxation, then the government might be responsible for an incredible outlay in the future.<sup>33</sup> After the Supreme Court of Pennsylvania found Mesta liable for the property taxes, a flurry of memos circulated in the War Department, requesting that information be compiled on the amount of federally-owned equipment on privately-held property.<sup>34</sup> After a few weeks, rough estimates were available, and the Department of Justice decided to join the Mesta Machine Company in its legal defenses.<sup>35</sup> The case went from the Board of Property Assessment, West Homestead, to the Allegheny County Court of Common Pleas, to the State Supreme Court of Pennsylvania, all the way to the Supreme Court of the United States of America. In January 1944, the Supreme Court found in favor of the Mesta Machine Company and the United States government and reaffirmed that federal property held on private land was immune from local taxation.

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<sup>31</sup>Mesta Machine Company and the United States of America v. County of Allegheny, Supreme Court of Pennsylvania, Case 77, March Term, 1943, 2-3. RG 107, entry 169, box 1308.

<sup>32</sup>Mesta Machine Company and the United States of America v. County of Allegheny, Supreme Court of Pennsylvania, Case 77, March Term, 1943, 2. RG 107, entry 169, box 1308; Mesta Machine Company and the United States of America v. County of Allegheny, Supreme Court of United States, Case 417, October Term, 1943, 20. RG 107, Entry 144.095, box 381.

<sup>33</sup>The Mesta contract, W-ORD-486, provided that the federal government would "reimburse the contractor for such taxes as it might be required to pay...." Myron C. Kramer (Major General, Judge Advocate General) to Attorney General, June 20, 1943, RG 107, entry 169, box 1308.

<sup>34</sup>Robert P. Patterson (Under Secretary of War) to Commanding General, Army Air Forces Materiel Command; Chief of Engineers; Chief of Ordnance; Quartermaster General; Chief Signal Officer; Chief of Transportation; Chief of Chemical Warfare Service, n.d., RG 107, entry 169, box 1308.

<sup>35</sup>Myron C. Kramer (Major General, Judge Advocate General) to Attorney General, June 20, 1943, RG 107, entry 169, box 1308. Government investment in private industry was estimated to be \$7,500,000 for all War Department industrial facilities. Of this, \$2,400,000 (32%) was DPC-owned. The total value of machinery and equipment owned by the War Department and located on private property was \$1,200,000, with DPC funding \$440,000 of this total. H.C. Minton (Brigadier General, Director, Production Division) to Under Secretary of War, September 16, 1943, RG 107, entry 169, box 1308.

Despite this controversy with the local government, Mesta continued its ambitious building program until 1944. With the 155-millimeter gun plant on line in 1941, Mesta won another contract with the Ordnance Department for carriages for sixteen-inch coastal defense guns. Valued at \$8,390,000, the contract was one of the largest Mesta had ever received, and the company invested \$1.5 million between 1941 and 1942 for the construction of additional buildings for heat treating facilities for the gun carriages and other large ordnance forgings.<sup>36</sup> The assembly buildings were large enough to maneuver the huge guns around a full 360 degrees.<sup>37</sup> Government equipment in the new facilities included four heat-treating pits, three cranes, and a 40-foot vertical boring mill.<sup>38</sup> Sunk 92 feet deep and served by cranes 110 feet above floor level, the heating pits contained gas and electric furnaces, shrinking pits, and quenching tanks for heat treatment of the big gun parts.<sup>39</sup> Much of this equipment was built by Mesta Machine and sold, at cost, to the federal government, as had been the arrangement in the 155-millimeter gun plant.

In 1942, Mesta entered into a contract with the Naval Department for the construction and operation of a plant adjacent to the western end of the company's property. Mesta designed, built, and operated this plant on a lease basis. Gun tubes, breech housings, ship shafts for cruisers and aircraft carriers, turbine rotors, and reduction gear rings were made at the naval plant.<sup>40</sup> By 1943, Mesta had completed all other expansion projects except for this facility, which was finished and put on line early in 1944.<sup>41</sup>

In 1943, Mesta diversified into magnesium and aluminum extrusion presses. In March 1943, Iversen petitioned the federal government to defer Mesta's contract for twenty-seven sixteen-

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<sup>36</sup>"Auxiliaries and Independents," *The Bulletin Index*, Pittsburgh, section 2, 1941, 25; *Annual Report*, 1941, and 1942.

<sup>37</sup>"Mesta Speeding Up on Guns and Heavy Equipment," *Steel* 108:25 (June 23, 1941), 45.

<sup>38</sup>*Annual Report*, 1945.

<sup>39</sup>Sylvester K. Stevens, *Pennsylvania: Titans of Industry* (New York: Lewis Historical Publishing, 1948), 483; *Men and Women of Wartime Pittsburgh and Environs* (Pittsburgh: Frank C. Harper, 1945), 256.

<sup>40</sup>*Men and Women of Wartime Pittsburgh and Environs*, 258.

<sup>41</sup>*Annual Report*, 1943, 1944..

inch guns, so that the company could produce aluminum extrusion presses for the aircraft industry. By May, the company was building three 4250-ton aluminum presses.<sup>42</sup> In 1944, Mesta delivered an 18,000 ton press, the largest die forging press ever constructed for light-metal forging in the United States. This press cost \$3.5 million and was designed for magnesium and aluminum forgings. The trade journal *Iron Age* declared that the forging press technology, which would be made available to any company having forging problems, would enable American companies to make magnesium forgings even larger than the five- to six-foot pieces made by the Germans.<sup>43</sup>

Other projects at Mesta Machine included forgings for smaller guns as well as at least one secret project for the Army. In 1944, Mesta received authorization to expand manufacturing facilities for M1, eight-inch gun tube forgings; M1, eight-inch gun jacket forgings; and M1, 240-millimeter Howitzer tube forgings. The company had been making many of these products since the early years of the war.<sup>44</sup> In 1944, while coordinating a heavy volume of backordered direct and indirect defense projects, the company built what was then the world's largest cannon; this was almost certainly the "secret project" listed on Mesta's project orders. Popularly known as "Little David," the cannon had a thirty-eight foot long barrel with a tube diameter of thirty-six inches and could hurl a 3650-pound shell approximately six miles.<sup>45</sup>

While the Mesta Machine Company made some of the largest pieces of manufacturing equipment employed for war production, its accomplishments cannot be measured in gargantuan size alone.

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<sup>42</sup>Memo from Army Services Forces to Under Secretary of War, Administrative Office, March 24, 1943, RG 107, entry 144.095, box 3B1; Lucius D. Clay (Major General, General Staff Corps, Assistant Chief of Staff for Materials) to Chief of Ordnance Department, n.d., RG 407, AG 473, Box 3713; Karl Feller (president, Schloemann Engineering Corporation, Pittsburgh) to S.W. Anderson (Aluminum and Magnesium Branch, War Production Board), May 21, 1944, RG 107, entry 169, box 1304.

<sup>43</sup>"WPB Sponsors and DPC Finances Huge Forging Press at Mesta Plant," *Iron Age* 154 (December 21, 1944), 138.

<sup>44</sup>Memo of Approval #2007, Expediting Production, April 27, 1944, RG 107, entry 144.095, box 381; "Mesta Speeding Up on Guns and Heavy Equipment," *Steel* 10B:25 (June 23, 1941), 45.

<sup>45</sup>Unpublished paper, uncatalogued material, Historical Society of Western Pennsylvania; Miscellaneous papers on Mesta Machine Company, HABS/HAER office, Homestead, PA.

The company also achieved design innovations, primarily in time and resource conservation. During the war, Mesta developed the first wide four-high continuous mill for rolling aluminum and aluminum alloy strip. The company also developed a new chemical and heat-treating technique that produced gun tubes superior to all previously made. In small gun production, Mesta also designed a gun drilling lathe that drilled from both ends simultaneously, cutting production time in half.<sup>46</sup>

#### *Domestic Projects*

While much of its production capacity was dedicated to the implements of war, Mesta Machine also maintained its position as the designer and builder of a broad range of equipment for the manipulation of steel. Like many other companies involved in direct and indirect war production, Mesta Machine had difficulty coordinating projects. With ordnance production receiving top priority, domestic and foreign steel projects often suffered, even though they were important aspects of war production.

The Brazilian steel mill illuminates perfectly the conflicts between direct and indirect defense production with which Mesta and many other companies engaged in war production had to grapple. In 1939, the United States government made a \$20 million loan to the Brazilian government to aid economic development, part of which was earmarked for a new steel mill. The United States felt that this investment would prove important to its "hemisphere defense" against the threat of German influence. Mesta received a hefty contract for a blooming mill for the Volta Redonda project (\$1,350,000). Other American firms involved in building various parts of the Companhia Siderurgica Nacional (National Steel Company) at Volta Redonda included Koppers Company (coke ovens, \$2,718,000), Arthur G. McKee Company (blast furnace, \$1,500,000), Ingersoll Rand Company (blowers and condensers, \$425,000), General Electric (turbo-generators, \$240,000), and Blaw-Knox (construction equipment, \$9,000).<sup>47</sup>

Although the government awarded the contracts in 1941, by May 1944 the mill was still not on line. The Mesta blooming mill was identified by the government and the other contractors as the primary bottleneck; in May of 1943, 60 percent of the mill parts cast by Mesta had been ready for machining, and one year later this was still the case. The Brazilian ambassador urged the Under Secretary of State, Edward Stettinius, former chairman of U.S. Steel, either to push Mesta to finish the mill or to farm out the

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<sup>46</sup>*Men and Women of Wartime Pittsburgh and Environs*, 258.

<sup>47</sup>"Mesta Awarded Contract for Brazilian Steel Mill," *Iron Age* 148 (September 18, 1941), 113.



project to another firm.<sup>48</sup> Stettinius explained that Mesta's delinquency on the Brazilian mill was due to other war projects, including a secret weapon for the Army, the Homestead Plate Mill, Navy Department projects, the Columbia Plate Mill, and two 10,000 ton forge presses for the Soviet Union.<sup>49</sup> According to an October 1944 report by the War Production Board, all of these projects were behind schedule due to labor shortages, lack of experienced replacement workers, the exhausting shift to the seven-day/twenty-four hour work program since Pearl Harbor, and increased private and federal orders. According to this report, the Brazilian mill, just two months behind schedule, faced the least inconvenience; the Soviet forge-presses were the worst off, with at least a nine month delay.<sup>50</sup> By late October 1944, William Batt, Vice-Chairman of WPB, assured Assistant Secretary of State Dean Acheson that only the Army secret weapon (probably the thirty-eight foot cannon) had precedence over the Brazilian blooming mill, and by early 1945, Mesta began the first large shipments of equipment to the Volta Redonda mill.<sup>51</sup>

One of the projects occupying much of Mesta's domestic productive capacity during these years was the 160-inch plate mill for the neighboring Homestead Works. Financed by over \$90 million from the Defense Plant Corporation, the Homestead mill gained new open hearth facilities, a 45-inch slabbing mill, a forge shop for which Mesta built a 7000-ton press, and a 160-inch plate mill. To outfit the 160-inch mill, Mesta Machine built several pieces of heavy equipment, including a scale-breaker, a four-high reversing mill stand, a leveler, and shearing machinery (side, end, and crop). Intended primarily for navy use, the expansion project was expected to produce ship plates, armor

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<sup>48</sup>Carlos Martins Pereira e Souza (Brazilian Ambassador) to Edward Stettinius (Under Secretary of State), May 29, 1944, RG 179, entry 512.422c, box 1451.

<sup>49</sup>Edward Stettinius to Carlos Martins Pereira e Souza, July 23, 1944, RG 179, entry 512.422c, box 1407; H.A. Houston (Industrial Consultant, WPB) to John B. Campbell (Deputy Vice Chair for Production, WPB), October 9, 1944, RG 179, entry 512.422c, box 1407.

<sup>50</sup>H.A. Houston (Industrial Consultant, WPB) to John B. Campbell (Deputy Vice Chair for Production, WPB), October 9, 1944, RG 179, entry 512.422c, box 1407.

<sup>51</sup>William Batt (Vice-Chairman, WPB) to Dean Acheson (Assistant Secretary of State), October 27, 1944, RG 179, entry 512.422c, box 1407; Warren E. McCann to John B. Campbell (Deputy Vice-President for Production, WPB), December 12, 1944, RG 179, entry 512.422c, box 1407.

plates, shell steel, and heavy forgings.<sup>52</sup> Expansion of this mill engulfed 120 acres of residential housing in the first and second ward of the borough of Homestead and displaced over 6,000 residents. The company selected the site for two main reasons: first, flat land on the banks of the Monongahela was at a premium in the crowded Pittsburgh region, and second, the first and second wards of Homestead separated two sections of the Carnegie-Illinois Steel Corporation, which the company felt should be joined. Although the project was announced in the local daily newspaper in June of 1941, it took a year to buy up and tear down the residential structures and start building the new defense plant.<sup>53</sup> The first heat was not tapped at the No. 5 open hearth until July 1943, and the first plate rolled out of the new 160-inch mill in February of 1944, just a year and a half before V-J day.<sup>54</sup> In comparison, the massive Geneva Steel plant, at Geneva, Utah, was a completely new facility and took just two years to build from the date the contract was signed.<sup>55</sup>

Several factors contributed to the delays at the Homestead 160-inch mill. First, buying the land in Lower Homestead proved to be a challenge. Land-titles were difficult to determine, some owners asked exorbitant prices, and the company agreed to hold off on construction until new housing for the displaced residents could be constructed.<sup>56</sup> Apart from these obstacles, the 160-inch mill was held up by production backlogs at the Mesta Machine Company. Operational and mechanical difficulties in the shearing department inhibited maximum production at least through September 1944.<sup>57</sup>

The Brazilian mill and the Homestead mill were not the only domestic steel expansion projects Mesta Machine was involved with

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<sup>52</sup>W.R. Slaughter (Lt. Colonel, Ordnance Department, Steel Committee) to F.T. Hammond, October 22, 1941, RF 107, entry 143, box 13.

<sup>53</sup>Curtis Miner and Paul Roberts, "Engineering an Industrial Diaspora: Homestead, 1941," *Pittsburgh History* 72:1 (Winter 1989), 10.

<sup>54</sup>"New Expansion Starts Production At Homestead, " *Iron and Steel Engineer* 20:7 (July 1943), 102; W.H. Gilleland and W.H. Hacker, "Homestead's 160-inch Plate Mill," *Iron and Steel Engineer* 24:10 (October 1947), 35.

<sup>55</sup>White, 74; Warren, 242.

<sup>56</sup>Miner, 11, 12.

<sup>57</sup>Before September 1944, the mill was operating on only one turn because some pieces of finishing equipment had not yet been installed. "Homestead Mill Adds Turn," *Iron Age* 154 (September 14, 1944), 126.

during World War II. Other projects included blooming, structural, and merchant mills for the Kaiser Company, Fontana, California; a bar mill for the Defense Plant Corporation at Republic Steel, South Chicago; and plate mills for Canadian and South African companies.<sup>58</sup>

#### *Finances at Mesta Machine During World War II*

Although business at the Mesta Machine Company boomed during World War II, profits did not always reflect this high level of activity. Excess profits taxes and voluntary price reductions significantly checked the profits garnered by the company.<sup>59</sup> However, for these years, the company operated at full capacity, twenty-four hours a day, seven days a week, to fill both ordnance contracts and non-defense orders. Chart 1 shows Mesta's net earnings between 1939 and 1946.<sup>60</sup> As the figures demonstrate, Mesta achieved its most drastic increase in net earnings between 1939 and 1942. In 1943, net earnings fell by almost \$1 million due to large voluntary price reductions made by the company on government contracts totaling approximately \$3.5 million.<sup>61</sup> Although the phenomenal growth rates achieved between 1939 and 1942 were not matched again and price reductions cut deeply into profits, earnings at the Mesta Machine Company still grew between 6 and 7 percent between 1943 and 1945.

**Chart 1: Change in Net Earnings**

| Year | Net Earnings |
|------|--------------|
| 1939 | 2,715,427    |
| 1940 | 3,083,082    |
| 1941 | 3,607,738    |
| 1942 | 3,625,763    |
| 1943 | 2,761,699    |

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<sup>58</sup>*Men and Women of Wartime Pittsburgh and Environs*, 257; Stevens, 483.

<sup>59</sup>Congress first established the excess profits tax in 1917 to capture wartime profits which were in excess of normal peacetime earnings. During WWII, Congress passed several rate structures for the excess profits tax, ranging from a 25 to 95 percent tax on profits. Earnings in excess of average profits for 1936-1939 were liable for this high rate of taxation. Sidney Ratner, "Excess Profits Tax," *Dictionary of American History* (New York: Scribner, c1976-c1978). Mesta Machine was first subject to excess profits taxes in 1941 and paid an approximate total of \$253,080,000 between 1941 and 1945.

<sup>60</sup>See Appendix A for net earnings between 1926 and 1956.

<sup>61</sup>*Annual Report*, 1943

|      |           |
|------|-----------|
| 1944 | 2,957,893 |
| 1945 | 3,153,741 |
| 1946 | 2,565,044 |

Source: Annual Report, 1939-1946

Data on the value of uncompleted orders illuminate the astronomical increase in volume and pace of production at the company during World War II. Chart 2 shows the value of uncompleted orders carried over year to year.<sup>62</sup> Unfortunately, precise figures are available only for 1938 to 1941; after 1942 the company released only approximate figures. Between 1939 and 1942, the value of uncompleted business increased from almost \$11 million to over \$70 million, an increase of approximately 550 percent. The value of uncompleted business increased over 100 percent twice during the war years, first between 1939 and 1940 and then again between 1941 and 1942. In 1944, Iversen reported to company shareholders that the uncompleted orders totaled approximately \$25 million, and over half of that amount was not expected to be affected by the termination of war contracts.

Iversen confidently predicted post-war prosperity for the company, and he was correct.<sup>63</sup> Even in 1946, the first full year of non-wartime production, Mesta operated at capacity and ended the year with approximately \$37 million of uncompleted business.

Chart 2: Uncompleted Business, 1939-1946

| Year | Uncompleted Business               |
|------|------------------------------------|
| 1939 | 10,797,740                         |
| 1940 | 22,954,048                         |
| 1941 | 35,842,547                         |
| 1942 | +70,000,000*                       |
| 1943 | double peacetime production record |
| 1944 | 25,000,000                         |
| 1945 | 20,000,000                         |
| 1946 | 37,000,000                         |

Source: Annual Report, 1939-1946

\* all figures 1942 and after are approximations.

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<sup>62</sup>See Appendix B for value of uncompleted orders between 1928 and 1956.

<sup>63</sup>Annual Report, 1944.

Figures on net capital expenditures reveal the company's outlay on building programs and maintenance operations throughout the war years. Expenses of this kind included expansion projects, as well as regular maintenance and improvement of existing facilities. Chart 3 shows how capital expenditures made by the company changed through the war years.<sup>64</sup> After a high point in 1940, from 1940 to 1944, capital expenditures fell 98 percent, from over \$2.5 million to about \$37,000, signaling the completion of Mesta's extensive wartime expansion projects.

The intersection of net earnings, capital expenditures, and uncompleted business reveals 1944 as a crest of wartime activity at the Mesta Machine Company. In strict financial terms, 1944 was not the high point of net earnings at the company; heavy taxation (about 95 percent) cut deeply into profits. While capital expenditures on in-house expansion projects dropped sharply between 1940 and 1944, the amount of uncompleted business increased dramatically during these years, peaking in 1942 and 1943. This may be explained by noting two conditions: first, government funding at Mesta increased during these years, reducing the amount of capital expenditures made by the company; and second, Mesta built much of the equipment for this expansion in-house, thereby cutting into the plant's potential output for other projects. After 1943, however, production backlogs were rectified as the company concentrated entirely on meeting production demands. Lorenz Iversen, president of the Mesta Machine Company, described 1944 as the highest level of contract completion in the company's history.<sup>65</sup> Thus 1944, a year of low capitalized expenditures, unremarkable net profits, and a high level of contract completion, nevertheless, can be considered the apex in Mesta's World War II defense activity.

**Chart 3: Change in Capital Expenditures**

| <b>Year</b> | <b>Capital<br/>Expenditures</b> |
|-------------|---------------------------------|
| 1939        | 24,205                          |
| 1940        | 2,640,670                       |
| 1941        | 1,398,576                       |
| 1942        | 985,330                         |
| 1943        | 272,083                         |
| 1944        | 36,973                          |

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<sup>64</sup>See Appendix C for capital expenditures for 1929 to 1956.

<sup>65</sup>Annual Report, 1944.

|      |         |
|------|---------|
| 1945 | 312,768 |
| 1946 | 189,844 |

Source: *Annual Report*, 1939-1946

#### *Labor at Mesta Machine During World War II*

Workers at Mesta Machine did not unionize until the late 1960's. Considering the activity of labor organization in the Pittsburgh district steel mills, this is somewhat surprising. As a relatively small, largely family-run organization, the company took a paternalistic attitude towards its employees, never permitting union organization or collective bargaining, but matching wage increases and benefits won by the steelworkers union. Although the CIO attempted to organize Mesta workers, the company steadfastly refused to meet with representatives not certified by the National Labor Relations Board.<sup>66</sup> Claiming that three thousand of Mesta's total four thousand employees had signed up with the CIO, the union scheduled and then canceled a strike for December 8, 1941, which had been intended to demonstrate the power of the organization.<sup>67</sup> In his 1947 Annual Report to the shareholders of Mesta Machine, Iversen identified industry wage increases as a cause of reduced profits. The cost of materials had increased, as had Mesta's own production costs; Iversen had matched the union-won pay raise.<sup>68</sup> In 1952, Iversen repeated this tactic.<sup>69</sup> With Lorenz Iversen as president, the Mesta Machine Company continued this policy through the late 1960's. A 1977 oral interview with a former Mesta employee recounts "old man [Lorenz] Iversen" handling workers' grievances and consistently matching pay increases and benefits won by the steelworkers' union. The former Mesta employee related that when John Iversen, son of the longtime president, took over in 1967, the workers "pestered" him with grievances until he finally gave in and accepted the union.<sup>70</sup>

Steel expansion during the late 1930's and the World War

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<sup>66</sup>"Mesta Refuses Union Conference," *Homestead Daily Messenger*, December 19, 1941, 1.

<sup>67</sup>"Strike at Mesta Canceled Because of War," *Homestead Daily Messenger*, December 8, 1941, 1.

<sup>68</sup>*Annual Report*, 1946.

<sup>69</sup>*Annual Report*, 1952.

<sup>70</sup>Interview, from Homestead Album Oral History Project, 1977 (Archives of Industrial Society, University of Pittsburgh).

II provided incentive to increase the number of employees at the Mesta Machine Company. Chart 4 shows the number of employees at Mesta between 1918 and 1959. Between 1930 and the high point of 1945, the number of employees at Mesta Machine increased over 100 percent. Although employment fell off after the end of World War II, it rose again through the 1950's, spurred on by the demands of the Korean War and the Cold War.

**Chart 4:** Employment at Mesta, 1918-1959

| Year | Number of Employees |
|------|---------------------|
| 1918 | 1207                |
| 1921 | 2348                |
| 1924 | 1,004               |
| 1927 | 1,214               |
| 1930 | 1,882               |
| 1935 | 3,014               |
| 1940 | 3,294               |
| 1945 | 4,055               |
| 1948 | 3,350               |
| 1951 | 3,746               |
| 1952 | 3,773               |
| 1953 | 3,725               |
| 1956 | 3,290               |
| 1959 | 3,601               |

Sources: *Industrial Directory for the Commonwealth of Pennsylvania, 1918-1959*; *Annual Report, 1948-1952*; Clipping files, Carnegie Public Library, Pennsylvania Department, Pittsburgh.

*Reconversion for Peace -- post-WWII and post-Korea*

Shifting from wartime to peacetime production was not a difficult transition for the Mesta Machine Company. All government-owned equipment was removed and returned by 1946, which was unusual since most companies in that position bought the equipment from the federal government. Some wartime-expansion projects at Mesta were terminated, but many remained open to accommodate post-war steel industry activity. The forge shop built in 1942 was closed and converted to storage because it was not needed for the company's regular line of work. The forge shop built in 1940 remained open after the war for production of heavy forgings. The sixteen-inch gun carriage buildings remained intact, and the forty-foot boring mill and the straightening press owned by the federal government remained at Mesta but were used by the company on an hourly fee basis. The ordnance aisle, 54,000 feet square, was used to ease congestion in the finishing department. Iversen expected that the high volume of post-war business

would prove the maintenance of capacity added during World War II a prudent investment.<sup>71</sup> For the most part, he was correct. Mesta maintained full capacity throughout the Korean War and the first decades of the Cold War, indicated by the high levels of uncompleted business carried-over each year. (see Appendix B). Profits also remained high through the late 1950's (see Appendix A), and in 1956 the Mesta Machine Company opened a new facility in New Castle, Pennsylvania. Mesta also maintained its relationship with the federal government, building a 50,000 ton forging press for the Air Force in 1952.<sup>72</sup>

#### Conclusion

Mesta Machine and the steel industry had a symbiotic relationship that lasted until the crisis of the early 1980's. Mesta Machine shut its doors in 1983, laying off several thousand workers. The fortunes of the Mesta Machine Company paralleled the growth and decline of the American steel industry from the company's founding in 1898. Like the steel industry that it supplied with engineering expertise and machinery, Mesta expanded and diversified its production during the World War II and profited substantially from this largely federally-financed growth. Mesta Machine offers a valuable case study of war expansion as well as the challenges and conflict of direct and indirect defense production during a time of national emergency.

The Mesta Machine Company is just one of an entire class of auxiliary industries that offer interesting avenues for future study. The analysis of companies that contribute to and profit from a dominant industry can provide us with a variety of fresh insights; it also illuminates new aspects in the history of the American industrial sector.

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<sup>71</sup>Annual Report, 1945.

<sup>72</sup>Annual Report, 1952.



**Appendix A: Net Earnings for the Mesta Machine Company, 1926-1956**

| <b>Year</b> | <b>Net Earnings</b>    |
|-------------|------------------------|
| 1926        | 694,813                |
| 1927        | 1,227,699              |
| 1928        | 1,051,474              |
| 1929        | 1,797,242              |
| 1930        | 2,509,176              |
| 1931        | 2,012,032              |
| 1932        | 327,871                |
| 1933        | 630,678                |
| 1934        | 1,517,250              |
| 1935        | 3,114,527              |
| 1936        | 4,266,965              |
| 1937        | 4,668,029              |
| 1938        | 2,909,957              |
| 1939        | 2,715,427              |
| 1940        | 3,083,082              |
| 1941        | 3,607,738              |
| 1942        | 3,625,763              |
| 1943        | 2,761,699              |
| 1944        | 2,957,893              |
| 1945        | 3,153,741              |
| 1946        | 2,565,044              |
| 1947        | 3,028,547              |
| 1948        | 5,025,281              |
| 1949        | 5,304,299              |
| 1950        | 5,600,524              |
| 1951        | 3,808,194              |
| 1952        | 2,709,597 <sup>1</sup> |
| 1953        | 3,500,416              |
| 1954        | 5,377,980              |
| 1955        | 3,653,945              |
| 1956        | 4,364,727              |

**Appendix B: Uncompleted Business at the Mesta Machine Company,  
1928-1956**

| <b>Year</b> | <b>Uncompleted<br/>Business</b>                                       |
|-------------|---|
| 1928        | 2,237,669   |
| 1929        | 5,649,231   |
| 1930        | 7,150,616   |
| 1931        | 1,568,841   |
| 1932        | 492,594   |
| 1933        | 1,799,510   |
| 1934        | 2,347,007   |
| 1935        | 8,164,878   |
| 1936        | 14,363,088  |
| 1937        | 13,074,460  |
| 1938        | 7,832,525   |
| 1939        | 10,797,740  |
| 1940        | 22,954,048  |
| 1941        | 35,842,547  |
| 1942        | +70,000,000 <sup>2</sup>  |
| 1943        | about<br>double<br>any<br>annual<br>peacetime<br>production<br>record |
| 1944        | 25,000,000  |
| 1945        | 20,000,000  |
| 1946        | 37,000,000  |
| 1947        | 46,000,000  |
| 1948        | 35,000,000  |
| 1949        | 31,000,000  |
| 1950        | 53,000,000  |
| 1951        | 59,500,000  |
| 1952        | 50,000,000  |
| 1953        | 38,700,000  |
| 1954        | 29,600,000  |
| 1955        | 91,400,000  |
| 1956        | 79,300,000  |

**Appendix C: Capital Expenditures at the Mesta Machine Company,  
1929-1956**

| <b>Year</b> | <b>Capital<br/>Expenditures</b> |
|-------------|---------------------------------|
| 1929        | 457,990                         |
| 1930        | 396,990                         |
| 1931        | 344,106                         |
| 1932        | none                            |
| 1933        | none                            |
| 1934        | 326,877                         |
| 1935        | not listed                      |
| 1936        | 1,058,061                       |
| 1937        | 1,116,754                       |
| 1938        | 43,062                          |
| 1939        | 24,205                          |
| 1940        | 2,640,670                       |
| 1941        | 1,398,576                       |
| 1942        | 985,330                         |
| 1943        | 272,083                         |
| 1944        | 36,973                          |
| 1945        | 312,768                         |
| 1946        | 189,844                         |
| 1947        | 133,268                         |
| 1948        | 258,849                         |
| 1949        | 444,534                         |
| 1950        | 270,926                         |
| 1951        | 816,999                         |
| 1952        | 950,000 <sup>3</sup>            |
| 1953        | 750,000                         |
| 1954        | 400,000                         |
| 1955        | 1,300,000                       |
| 1956        | 1,000,000 <sup>4</sup>          |

1. Iversen explains the drop in net earnings for this year as due to wage increases and fringe benefits given to workers that match those given by the steel industry.

2. all figures 1942 and after are approximations.

3. all figures 1952 and after are approximations.

4. date of New Castle plant purchase.